

Wonderware and Trainyard Tech Keep Norfolk Railway on Track with Automation Solution

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Dan Niemiec, Principal,
Trainyard Tech.

Columbus, OH — The history of rail transport dates back nearly 500 years with systems relying on horse power and even humans, and rails of wood or stone. Modern rail transport systems first appeared in the 1800s. These systems, which used the steam locomotive, were the first practical and primary forms of mechanized land travel for the next 100 years.

Norfolk Southern Railway Company continues the legacy of rail transportation as the fourth largest railroad in the world. It operates more than 21,500 route miles in 22 states as well as in Ontario, Canada, and uses modern-day automation technology from Wonderware to ensure the smooth operation of its rail lines.

Wonderware Software/Hardware Combination Effectively Manage Operations

Wonderware software is used to manage operations at the railroad company's "hump" yard in Columbus, Ohio. A hump yard is a regional gathering point where freight is classified and forwarded to final destinations.

The process of joining the right train cars to the right engines takes place in three areas: a receiving yard, a classification yard in which railcars are pushed over a "hump" to various classification tracks and a forwarding yard.

Norfolk Southern Railway uses a supervisory HMI software solution from Wonderware to communicate vital information about its train cars at its Buckeye Hump Yard.

"Wonderware's industrial computer line has been a great fit for Trainyard Tech's systems integration operations," said Darren Kline, Marketing Manager for Q-Mation, Wonderware's local distributor, which has been providing Trainyard Tech with support and services since the beginning of the project.

"Wonderware's panel PCs gets used in various areas in the control room, but the tablet PC is perfect for this type of environment. Railyards have a very distributed area in which people managing operations need to be able to control things from out in the field."



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Tim Forman, Trainmaster,
Norfolk Southern Railway Company.



Yardmaster can view and access same information as trainmaster and pin-puller.

When the system initially became automated, an entire view of the mainframe and mid-range computer systems was required for operators to effectively manage operations. Then, in the early 1990s, Trainyard Tech LLC, a Wonderware original equipment manufacturer, installed Wonderware's InTouch human-machine interface software running on the Microsoft Windows 3.0 operating system.

Now, all of the information is processed through eight PCs. Implementing InTouch software for visualization and industrial process control enables users to quickly create and deploy customized applications that connect and deliver real-time information.

Applications can be accessed from mobile devices, thin clients, computer nodes and over the Internet. For Norfolk, critical pin puller information is easily accessible using Wonderware HMI displays.

"Prior to having a graphical display, the pin pullers had a paper list where they would mark down where all the cars had to be cut," said Dan Niemiec, Principal, Trainyard Tech.

"Today, the pin puller display supplies condensed information about the location of each car, what track it is going to and any special handling codes.

The yardmaster also can access this information. To keep things in sync between the pin puller and the yardmaster, we were able to provide an InTouch HMI screen to the yardmaster's display so they can both view and access the same information."

When a train arrives at the hump yard, scanners with antennas collect information from RFID tags on each train car. Alternatively, a field engineer can manually input data from anywhere in the yard into the supervisory system using Wonderware industrial tablets.

This information can be reviewed simultaneously by several train yard employees such as the trainmaster, the receiving yardmaster and the assembly yardmaster who re-assembles the train cars at the end of the humping process.

Using symbols like asterisks and plus and minus signs, the pin puller display verifies which train cars have arrived at the yard and ensures that they match the list of cars provided by Norfolk. If there is a discrepancy, the yard personnel can address it right away.

Efficiency and Safety Are Key

Increasing efficiency is important because the Buckeye Yard can receive up to 2,000 train cars in any given day. Safety also is key because of the sheer tonnage handled and the dangerous nature of working on the railroad.

"The new software has definitely increased the work efficiency of both the yardmasters and the trainmasters here at Buckeye," said Tim Forman, trainmaster at Norfolk Southern Railway Company. "With the Wonderware software, we've become more of a point-and-click operation versus having to manage operations manually.

In addition, the new Wonderware system has definitely decreased the labor costs involved with the repair and upkeep of the system on a day-to-day basis. We've been able to remove a lot of old and antiquated equipment we no longer need due to the upgrades in the current software."



Field engineers can manually input data from anywhere in the yard using Wonderware industrial tablets.

Buckeye uses a "gravity humping" technique in which at least 100 train cars weighing up to 12,000 tons are shoved to the top of a hill and then carefully rolled down and directed to 40 "classification tracks" where the individual cars are re-sorted and grouped depending on their content and destination.

So much weight rolling downhill can be very dangerous for yard workers. Mechanisms similar to automobile disc brakes called retarders are used to slow train cars down. The InTouch software collects and shares information on which retarders are active to keep the workers on the track better informed and safe.

Reduced Development Time

Trainyard Tech has realized substantial savings in development time on implementing engineering projects like this one. "The most intriguing thing about the Wonderware system is that you can basically do anything you want," Niemiec said. "Whatever problem you'd like to solve, Wonderware's graphical HMI allows you to do it."

Using InTouch as the front-end to the process control system, we've enabled Norfolk Southern Railway to provide critical information to the yardmaster who is the primary user of the system. Online help screens also are available which enables shorter training times. Using the InTouch package, we've reduced our development time for the HMI probably 40 to 50 percent."

Having worked on the train yards since the mid-1970s, Trainyard Tech's leaders have decided on a company slogan of "Keep Em Rolling." With the help of Wonderware's supervisory HMI software solution, both Trainyard Tech and Norfolk Southern's Buckeye Hump Station is expected to do just that.



Scanners with antennas collect information from RFID tags on each train car.

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